

REMARKS

This amendment is responsive to the Office Action dated November 19, 2004. Claims 1 - 9 are pending in this application. Claims 1 - 5, 7 and 8 are rejected. Claims 6 and 9 are objected to, but are otherwise allowable if rewritten in independent form.

Specification

Applicant has amended the specification to reflect the correct value of the index of refraction for BK7. Applicant has also stated that the index value is 1.5146 at paragraph [0052].

Claim Rejections - 35 USC §103

Claims 1 - 5 and 7 - 8 have been rejected as being obvious over Chu '937. This rejection is respectfully traversed for the reasons which follow.

In Applicant's invention as set forth in amended claim 1, Applicant requires a light source obliquely incident on a reflection type liquid crystal display device. This can be seen in Applicant's Figure 1A where green light passes through the colored decomposing cross dichroic prism (16) and is incident at an oblique angle on the reflection type LCD (19) as claimed. In Figure 1B there is shown a top view of the light passing through cross dichroic prism (16) and, hence, to reflection type LCD

(19). This is shown in greater detail in Figure 2 where the green light is again as incident on reflection type LCD (19) and then is transmitted back to a color-combining prism (21) which receives other colors of light which are separated out from the green light (blue and red).

Applicant beginning at line 8 of claim 1, sets forth the requirements for the cross dichroic prism. The equations 1 or 2 stated in claim 1 are met by the disclosure of Chu '937.

Chu, however, does not teach, suggest or otherwise render Applicant's claimed invention obvious. First, Chu does not disclose the location of any liquid crystal display device, nor does Chu disclose a light source obliquely incident on such a reflection type liquid crystal display device. Chu does not disclose anything that responds to Applicant's Figures 1A, 1B or 2. Chu does not disclose how the color selective beam splitter is used in a system, and, therefore, does not suggest the invention set forth in claim 1.

In case of the cross dichroic prism, as the Applicant's claims, a red-reflecting surface and a blue-reflecting surface are disposed substantially orthogonal to each other. Therefore, when a luminous flux is incident on this (color decomposition) cross dichroic prism, each color light component passes the prism in the two different ways. For example, in the case of the red color light component, one traces reflection of red-reflecting surface, transmission of blue-reflecting surface and then

emission. The other traces transmission of blue-reflecting surface, reflection of red-reflecting surface and then emission. (This is clearly shown in Figures 16A - 16C of the application.) These two different traces produce the difference of tint and optical intensity in the images projected on the screen. Therefore, in Applicant's claims, the kind of material and the multiplayer method of the material is claimed so as to eliminate the difference of tint and optical intensity of the images after taking these two different traces.

The above-mentioned problem and its solution method are applied to the claimed cross dichroic prism, but cannot be applied to the other dichroic prisms, for example, Philips type prism. Applicant respectfully submits that this application should not be rejected based on the dichroic prism of Chu '937 which is different from the cross dichroic type.

Chu is not a Cross Dichroic Prism

In amended claim 1, applicant specifies that the invention uses a cross dichroic prism. Applicant then requires that the luminous flux be incident oblique to an axis of the cross dichroic prism (off axis type). See oblique entrance, Applicant's Figures 1A and 2.

As explained in paragraphs [0007] and [0008] in the specification, when the oblique incidence type cross dichroic prism is used in the conventional reflection type liquid crystal

projector, each color light component varies depending on the order of incidence on the dichroic films (111), (112), and the quantity of light obtained may differ between upper and lower halves of the incident luminous flux. As a result, the tint and optical intensity of images projected onto the screen may differ between right and left (or upper and lower) parts. The invention of claim 1 was accomplished to solve this problem.

The Examiner argues that Chu, while not showing an X prism as a dichroic prism of Figure 2, uses a different design which is cheaper to fabricate requiring fewer steps. The Examiner argues that it would be obvious to one of ordinary skill in the art at the time of the invention was made to make Chu's dichroic prism a cross prism. This is not supported by Chu who teaches directly away from the use of a cross dichroic prism in column 1, lines 15 through 30. Chu even teaches that the approach of a cross prism suffers from low yield high cost since at least two thin film beam splitters have to be coated, and the thin-film systems are complex and hard to fabricate. This not only does not render Applicant's claimed invention obvious, it teaches directly away from it.

In the outstanding Office Action at page 6, paragraph 7, the Examiner states that the prior art does not specifically teach the luminous flux from the light source being incident on the entrance surface of the cross dichroic prim at an angle making the luminous flux oblique to an axis of the cross dichroic prism

while teaching all the limitations in claim 1. Applicant does not state in claim 1 whether the cross dichroic prism has incident light at any specific angle be it perpendicular or some other angle.

A review of the other claims dependent from claim 1 shows that they are also not claiming any angle of entry of the light to the dichroic prism, although such an angle is shown in Figures 1A and 2.

In '937, at column 1, lines 20 to 25, US Patent 5,339,158 to Akiyama is cited. A copy of the '158 patent is included for the Examiner's reference. In the '158 patent, the light as depicted in Figure 3 is applied to the reflection type liquid crystal display devices at an angle perpendicular, the cross prism is used to combine the RGB lights being transmitted from the liquid crystal display devices. This patent does not suggest or teach the oblique incidents on a reflection type liquid crystal display device as claimed. Still further, this patent, while being cited by '937 as prior art, shows that the inventor of '937 did not find such a cross dichroic prism to be of any value, teaching, or suggestion of Applicant's claims which have not yet been allowed.

In view of the foregoing, it is respectfully submitted that the application is now in condition for allowance, and early action in accordance thereof is requested. In the event there is any reason why the application cannot be allowed in this current


S/N: 10/665,549

3/11/2005

Docket No.: KAW-305-USAP

condition, it is respectfully requested that the Examiner contact the undersigned at the number listed below to resolve any problems by Interview or Examiner's Amendment.

Respectfully submitted,


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Date: March 11, 2005

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